REMARKS

Claims 1-54 are pending, with claims 1, 10, 19, 27, 33, 34, 36, 41, 45 and 50 being independent. Claims 45 and 50 have been amended. No new matter has been added. Reconsideration and allowance of the above-referenced application are requested.

The Art of Record Fails to Teach or Suggest Prioritization as Claimed:

Claims 19, 24-27 and 32 stand rejected under 35 U.S.C. 102(b) as allegedly being anticipated by Stamer et al. (US 4,727,235). Claims 20-21 and 28-29 stand rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Stamer et al. in view of Nakano et al. (US 4,734,558). Claims 22 and 30 stand rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Stamer et al. in view of Woelki et al. (US 5,329,090). Claims 23 and 31 stand rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Stamer et al in view of Hasebe et al. (US 5,734,412). These contentions are respectfully traversed.

Stamer describes a laser marking system with multiple lasers and lens that form a vertical column of beams that mark "strokes" (vertical pixel elements) of dot matrix characters. (*See* Stamer et al. at col. 2, line 52 to col. 3, line 37.) Stamer's focus is on compensating for variations in laser output power and avoiding nonlinearities when marking on a moving substrate. (*See* Stamer et al. at Abstract.) Stamer marks the dot matrix characters one stroke at a time on the moving substrate, but Stamer does not prioritize an order in which the pixels are printed, as recited in independent claims 19 and 27.

The laser marking system in Stamer marks one stroke at a time from left to right to form a character. (*See* Stamer et al. at Fig. 2 and col. 3, lines 26-37.) Figure 2 of Stamer indicates that the substrate can move in either direction, but there is no indication in Stamer that the pixels can be marked in an order other than that shown. Thus, Stamer does not describe prioritizing an order in which the pixels are printed, as claimed, and independent claims 19 and 27 are in condition for allowance.

Dependent claims 20-26 and 28-32 are patentable for at least the above reasons, and based on their own merits. For example, with respect to claims 20-21 and 28-29, a prima facie case of obviousness has not been established. Nakano discloses a laser machining apparatus that includes a device for generating a transparent optical aperture by controlling an optical material in either an electrical or an optical manner. (*See* Nakano et al. at Abstract.) The optical aperture is generated in a light valve 75. (*See* Nakano et al. at col. 5, lines 46-48.) The light valve 75 creates undesirable scattered light, which can be intercepted by an aperture 77. (*See* Nakano et al. at col. 7, lines 31-35.) Since the light valve 75 of Nakano creates the scattered light that is then intercepted by the aperture 77, and since Stamer has no need of a light valve 75, the identified motivation to combine Nakano's aperture 77 with Stamer is insufficient. Moreover, even if Nakano and Stamer could be combined as suggested, the combination would not result in the claimed subject matter. Neither Nakano nor Stamer teaches or suggests prioritizing pixels for printing based on an aperture that limits an area within which the printing system is able to print, as recited in claims 21 and 29.

Claims 22 and 30 are also patentable because, although Woelki discloses pixels constructed from a plurality of spots, Woelki does not disclose prioritizing the order which the spots are printed such that the spots are printed in a direction which is opposite to the direction which the product moves. Claims 23 and 31 include features similar to those recited in claims 1, 10, 33 and 36 and are thus also patentable for reasons addressed below in connection with claims 1, 10, 33 and 36.

The Art of Record Fails to Teach or Suggest Data Set Correction as Claimed:

Claims 1-3, 5-12, 33 and 36 stand rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Hasebe et al. (US 5,734,412) in view of Cameron et al. (US 5,767,483). Claims 4, 13-18 and 37-38 stand rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Hasebe et al. in view of Cameron et al., and further in view of Stamer et al. These contentions are respectfully traversed.

Hasebe discloses a scan type laser marking device that adjusts scan speed by adjusting coordinate data. (*See* Hasebe et al. at Abstract; col. 12, lines 19-30; and Figs. 10 & 11A-11C.) But Hasebe's coordinate data does not indicate positions that pixels will occupy because the coordinate data output always stays ahead of the laser marking. (*See* Hasebe et al. at col. 10, lines 28-43.) Thus, Hasebe does not disclose generating a corrected data set indicating positions that pixels would occupy if each pixel was moved at a velocity of the product until the pixel was printed, as recited in claims 1, 10, 33 and 36.

Additionally, a prima facie case of obviousness has not been established because a proper motivation to combined the references has not been identified, and there is not a reasonable chance of success for the proposed combination. Hasebe is directed to a scan type laser marking device including a device for setting the laser scanning speed to mark a moving object. (*See* Hasebe at Abstract.) Cameron is directed to forming a normally invisible (to the naked eye) sub-surface mark in a material, such as glass, by forming localized stress patterns using carefully controlled variations in laser power or velocity. (*See* Cameron et al. at Abstract and col. 7, line 36 to col. 8, line 26.) The precision marking technique described in Cameron should be performed on a stationary object to avoid "breakout" (cracking of the glass). (*See* Cameron et al. at Abstract and col. 7, lines 24-35.) Thus, one skilled in the art would have no motivation to combine Cameron's system for precision marking of stationary objects with Hasebe's moving object marking device, and there is not a reasonable chance of success for this proposed combination.

For all of these reasons, independent claims 1, 10, 33 and 36 are in condition for allowance. Dependent claims 2-9, 11-18 and 37-38 are patentable for at least the above reasons, and based on their own merits. For example, a prima facie case of obviousness has not been established for these claims because a proper motivation to combined the references has not been identified, and there is not a reasonable chance of success for the proposed combination. Stamer is directed to equalizing power output in a laser marking system (with multiple lasers and lens that form a vertical column of beams that mark vertical pixel elements of dot matrix characters in parallel) by increasing the on time of weaker output lasers relative to the more powerful lasers.

(*See* Stamer et al. at Abstract and col. 2, line 52 to col. 3, line 37.) Hasbe uses a single scan-type marking laser, and thus has no need for the multiple lasers and output power equalization techniques of Stamer Moreover, Cameron uses a single laser, and requires a laser beam having an energy density falling within a narrowly defined range and carefully controlled output variations in laser power or velocity. (*See* Cameron et al. at col. 7, line 24 to col. 8, line 26.) Thus, one skilled in the art would have no motivation to combine Stamer with Cameron or Hasebe, and there is not a reasonable chance of success for these proposed combinations.

The Art of Record Fails to Teach or Suggest Density Change as Claimed:

Claims 34-35, 39 and 41-43 stand rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Stamer et al. in view of Loewenthal et al. (US 5,294,942). Claims 40 and 44 stand rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Stamer et al. in view of Loewenthal et al., as applied to claims 34 and 41, and further in view of Nakano et al. These contentions are respectfully traversed.

Loewenthal describes a "non-impact printer apparatus and method for recording on a medium that is moving at a variable rate. A plurality of recording elements arranged transverse to movement of the medium records respective pixels. Each pixel is formed by enabling each recording element a plurality of times during a pixel recording period. To maintain uniformity in pixel recording a duration for recording a sub-pixel and the number of sub-pixels per pixel are adjusted in accordance with the speed of the recording medium. The sum of the sub-pixel recording durations during a pixel recording period comprises the pixel exposure time." (*See*

Loewenthal et al. at Abstract; emphasis added.) Loewenthal maintains a desired exposure time per pixel (per one column width) by decreasing the sub-pixel exposures with increasing web speed. (*See* Loewenthal et al. at col. 3, lines 2-32.) Thus, as the speed of the web increases, the number of sub-pixel exposures can be decreased to maintain a constant pixel density.

Loewenthal expressly states that his objective is to provide uniform density over the area of the pixel. (*See* Loewenthal et al. at col. 5, lines 38-42.) The cited portion of Loewenthal, which mentions changing the density of the pixels, refers to changing the desired exposure time for a pixel, "based on experimental results taking into account LED brightness and film sensitivity for the wavelength of light from the LEDs." (*See* Loewenthal et al. at col. 4, line 22 to col. 5, line 2.) Loewenthal does not link changes in pixel density with changes in the web speed. Additionally, a prima facie case of obviousness has not been established because: (1) the identified motivation to combine ("to provide a more uniform density" on page 11 of the Office Action) actually teaches away from the presently claimed subject matter; and (2) the very different printing technologies of the two references (e.g., light emitting diodes in Loewenthal and CO_2 lasers in Stamer) indicate there is not a reasonable chance of success for the proposed combination.

For all of these reasons, independent claims 34 and 41 are in condition for allowance. Dependent claims 35, 39, 40 and 42-44 are patentable for at least the above reasons, and based on their own merits. For example, claims 40 and 44 are also patentable for reasons addressed above in connection with Nakano and claims 20-21 & 28-29.

The Art of Record Fails to Teach or Suggest Adjustable Dwell Time as Claimed:

Claims 45-47 and 50-52 stand rejected under 35 U.S.C. 102(b) as allegedly being anticipated by Cameron et al. (US 5,767,483). Claims 48-49 and 53-54 stand rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Cameron et al. in view of Sato (US Patent 6,681,055). These contentions are respectfully traversed.

Cameron describes laser marking involving forming a normally invisible (to the naked eye) sub-surface mark in a material, such as glass, by forming localized stress patterns using carefully controlled variations in laser power or velocity. (*See* Cameron et al. at Abstract and col. 7, line 36 to col. 8, line 26.) In the varying-velocity implementation:

> rather than moving at a constant speed from one end of a straight line scan to the other, the beam is scanned in a series of incremental steps which serve to increase the definition and resolution of the characters thus produced. As a result, the velocity of the beam varies in a manner which is approximately sinusoidal between zero when the beam is at either end of one of its incremental steps, and so is effectively at rest, and approximately 3 m/s at a point midway between these two ends. Consequently, even though the power density of the beam is kept constant, different points on the surface of the bottle are exposed to different beam energies. It has been found that the energy density window for the generation of the aforementioned mark is sufficiently narrow that the lens-shaped mark and its associated stressed region are only observed at those points at which the beam is effectively at rest."

(*See* Cameron et al. at col. 7, lines 39-55; emphasis added.)

Thus, Cameron describes a straight line laser scanning technique in which the beam is periodically slowed to form invisible (to the naked eye) marks, but this periodic slowing (approximately sinusoidal velocity) does not constitute adjusting a dwell time at locations to

which a laser beam is directed to form spots at the locations. To the contrary, Cameron makes very clear that his laser only passes through zero velocity by noting that the beam is only effectively at rest; and the approximately sinusoidal velocity is important for maintaining glass strength during the marking process:

> In both of the foregoing embodiments it is thought that the gradual increase in energy absorbed by the glass at points closer to that at which a mark is actually created provides the glass with a limited ability to anneal itself. This is to be contrasted with an arrangement in which the laser beam is pulsed to generate a series of marks at locations spaced an arbitrary distance apart. The self-annealing nature of the aforementioned embodiments is considered to provide a marked body whose strength is not compromised by the marking process.

(*See* Cameron et al. at col. 8, lines 10-19; emphasis added.) In contrast, the present application is directed to generating spots at specific locations by directing a laser beam to dwell at those locations, which may be spaced an arbitrary distance apart.

Nonetheless, in order to expedite prosecution, and to better distinguish the claimed subject matter, independent claims 45 and 50 have been amended. Claim 45 now further recites, "wherein the electronics are configured to accept input that governs time spent by the printing beam dwelling at the locations to alter the optical characteristic." Claim 50 now further recites, "wherein said adjusting is based on user input dwell time information corresponding to the material." Support for these amendments can be found throughout the application as filed. (*See e.g.*, the present specification at page 19, line 22 to page 20, line 11.) The claimed subject matter allows low power lasers to be used in marking many different types of product materials since the beam can be directed to arbitrarily placed locations on a product and dwell time at those

locations can be increased as needed until a visible spot is formed at those locations. The art of record fails to teach or suggest the claimed adjustable dwell time to promote the above-described advantages.

For all of these reasons, independent claims 45 and 50 are in condition for allowance. Dependent claims 46-49 and 51-54 are patentable for at least the above reasons, and based on their own merits. For example, claims 46-47 and 51-52 are patentable because the techniques described in Cameron indicate that the laser beam is de-activated in the course of forming the symbols. (*See* Cameron et al. at Figs. 4 & 5, and col. 7, line 24 to col. 8, line 26.)

It is believed that all of the pending claims have been addressed. However, the absence of a reply to a specific issue or comment does not signify agreement with or concession of that issue or comment. Because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment.

It is respectfully suggested for all of these reasons, that the current rejection is totally overcome; that none of the cited art teaches or suggests the features which are now claimed, and therefore that all of these claims are in condition for allowance. A formal notice of allowance is thus requested.

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Please apply the $1020.00 three month Extension of Time fee, and any other necessary charges or credits to deposit account 06-1050.

Respectfully submitted,

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